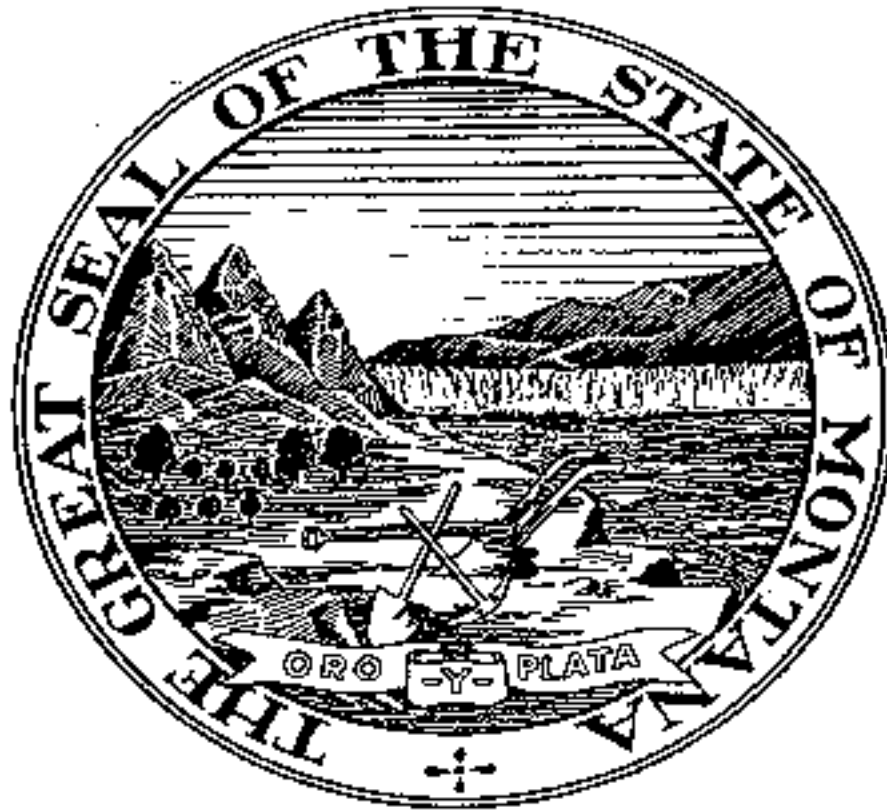


Fall Protection for Construction

Occupational Safety and Health Bureau



Montana Department of Labor and Industry

Prepared for Montana Employers
by the

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Fall Protection for Construction

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Fall Protection for Construction

This informational booklet is intended to provide a generic, non-exhaustive overview of the Occupational Safety and Health Administration (OSHA) Fall Protection Standards (29 CFR Subpart M, Fall Protection, 1926.500, 1926.501, 1926.503). This booklet does not itself alter or determine compliance responsibilities, which are set forth in OSHA standards themselves. Employers should obtain current standards to ensure compliance due to any changes. Copies of the OSHA standards and other safety and health information are available free of charge from the OSHA web site at www.osha.gov.

I. Introduction

Falls are the leading cause of worker fatalities in the construction industry. Each year, on average, between 150 and 200 workers are killed and more than 100,000 are injured as a result of falls at construction sites. The standard for fall protection deals with both the human and equipment-related issues in protecting workers from fall hazards. To help avoid accidents at construction sites employers and employees need to do the following:

- ◆ Where protection is required, select fall protection systems appropriate for given situations.
- ◆ Use proper construction and installation of safety systems.
- ◆ Supervise employees properly.
- ◆ Use safe work procedures.
- ◆ Train workers in the proper selection, use, and maintenance of fall protection systems.

II. Fall Protection Standard Coverage

The OSHA fall protection standard was developed to prevent employees from falling off, onto, or through working levels and to protect employees from being struck by falling objects. The performance-oriented requirements make it easier for employers to provide the necessary protection.

The standard covers most construction workers except those inspecting, investigating, or assessing workplace conditions prior to the actual start of work or after all work has been completed. The standard covers the following areas and activities: ramps, runways, and other walkways, excavations, hoist areas, holes, formwork, and reinforced steel, leading edge work, unprotected sides and edges, overhand bricklaying and related work, roofing work, precast concrete erection, wall openings, residential construction, and other walking/working surfaces.

The standard sets a uniform threshold height of 6 feet (1.8 meters), this provides consistent protection. Construction employers must protect their employees from fall hazards and falling objects whenever an affected employee is 6 feet or more above a lower level. Protection must also be provided for construction workers who are exposed to the hazard of falling into dangerous equipment.

Under the standard, employers are able to select fall protection measures compatible with the type of work being performed. Fall protection can be provided through the use of guardrail systems, personal fall arrest systems, safety net systems, positioning device systems, and warning line systems, among others. Employers must identify and evaluate all fall hazards as well as provide specific training to workers who will be exposed to these hazards. Requirements for fall protection for workers on scaffolds and ladders and for workers engaged in steel erection of buildings are covered in other subparts of OSHA regulations.

III. Requirements of the Standard

Under 29 CFR Subpart M, Fall Protection, 1926.501, employers must assess the workplace to determine if the walking or working surfaces on which employees are to work have the strength and structural integrity to safely support workers. Employees are not permitted to work on those surfaces until it has been determined that the surfaces have the requisite strength to support the workers. Once employers have determined that the surface is safe for employees to work on, the employer must select one of the options listed for the work operation if a fall hazard is present.

For example, if an employee is exposed to falling 6 feet or more from an unprotected side or edge, the employer must select either a guardrail system, safety net system, or personal fall arrest system to protect the worker.

A. General –1926.502 (a)

Employers shall provide and install all fall protection systems required by this subpart for an employee, and shall comply with all other pertinent requirements of this subpart before that employee begins the work that necessitated the fall protection.

B. Guardrail Systems – 1926.501 {502(b)}

If the employer chooses to use guardrail systems to protect workers from falls, the system must meet the following criteria.

Toprail height

1. The top edge height of toprails, or guardrails must be 42 inches plus or minus 3 inches above the walking or working level.
2. When workers are using stilts, the top edge height of the top rail, or equivalent members, must be increased an amount equal to the height of the stilts.

Guardrail construction

1. Toprails and midrails must be at least one-quarter inch nominal diameter or thickness to prevent cuts and lacerations.

2. If wire rope is used for toprails, it must be flagged at not more than 6 feet intervals with high-visibility material.
3. Steel and plastic banding cannot be used for toprails or midrails.
4. Manila, plastic, or synthetic rope used for toprails or midrails must be inspected frequently to ensure strength and stability.
5. Guardrails systems must be surfaced to protect workers from punctures or lacerations and prevent clothing from snagging.
6. The ends of the top rails and midrails must not overhang terminal posts, except where such overhang does not constitute a projection hazard.

Midrail and intermediate member height

1. Midrails, screens, mesh, or equivalent intermediate structural members must be installed when there are no systems walls or parapet walls at least 21 inches high.
2. When midrails or other intermediate structural members are used they must be installed at a height midway between the top edge of the guardrail system and the walking/working levels.
3. When screen or mesh are used, they must extend from the top rail to the walking/working level and along the entire opening between top rail supports.
4. Intermediate members, such as balusters, when used between posts, can not be more than 19 inches apart.
5. Other structural members, such as additional midrails and architectural panels, must be installed so that there are no openings in the guardrail system more than 19 inches.

Guardrail system strength

1. The guardrail system must be capable of withstanding a force of at least 200 pounds (890 Newtons) applied within 2 inches of the top edge in any outward or downward direction.
2. When the 200 pound test is applied in a downward direction, the top edge of the guardrail must not deflect to a height less than 39 inches above the walking /working level.
3. Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members must be capable of withstanding a force of at least 150 pounds

(666 Newtons) applied in any downward or outward direction at any point along the midrail or other member.

Other guardrail system requirements

1. When guardrail system are used at hoisting areas, a chain, gate or removable guardrail section must be placed across the access opening between guardrail sections when hoisting operations are not taking place.
2. At holes, guardrails must be set up on all unprotected sides or edges.
3. When holes are used for passage of materials, the hole shall have not more than two sides with removable sections. When the hole is not in use, it must be covered or provided with guardrails along all unprotected sides or edges.
4. If guardrail systems are used around holes that are used as access points (ladderways) gates must be used or the point of access must be offset to prevent accidental walking into the hole.
5. If guardrails are required on ramps or runways, they must be erected on each unprotected side or edge.

C. Safety Net Systems – 1926.502 (c)

1. Safety nets shall be provided when workplaces are higher than 25 feet above ground or water surfaces or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines or safety belts are impractical.
2. Safety nets must be installed as close as practicable under walking/working surface on which employees are working, and never more than 30 feet below such levels.
3. Defective nets must never be used.
4. Safety nets need to be expected at least once a week for wear, damage, and other deterioration
5. The maximum size of each safety net mesh opening shall not exceed 36 square inches nor be longer than 6 inches on any side, and the openings, measured center-to-center, of mesh ropes or webbing, shall not exceed 6 inches.
6. All mesh crossings be secured to prevent enlargement of the mesh opening.
7. Each safety net or section must have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2 kiloNewtons). All new nets shall meet accepted performance standards of 17,500 foot-pounds minimum impact resistance as determined and certified by the manufactures, and bear a label of proof test.

8. Connections between safety net panels must be as strong as integral net components and be spaced no more than 6 inches apart.
9. Safety nets need to be installed with sufficient clearance underneath to prevent contact with the surface or structure below.
10. When nets are used on bridges, the potential fall area from the walking/working surface to the net must be unobstructed.
11. Safety nets must extend outward from the outmost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net surface	Minimum required horizontal distance of outer edge of net from edge of working surface
Up to 5 feet (1.5 meters)	8 feet (2.4 meters)
More than 5 feet (1.5 meters) up to 10 feet (3 meters)	10 feet (3 meters)
More than 10 feet (3 meters)	13 feet (3.9 meters)

12. Safety nets must be capable of absorbing an impact force of a drop test consisting of a 400-pound bag of sand 30 inches in diameter dropped from the highest walking/working surface at which are exposed, but not less than 42 inches above that level.
13. Items that have fallen into safety nets including but not restricted to, materials, scrap, equipment, and tools- must be removed as soon as possible.

D. Personal Fall Arrest Systems – 1926.502 (d)

The use of a body belt for fall arrest is prohibited; however, the use of a body belt in a positioning device system is acceptable.

1. Connectors must be drop forged, pressed or formed steel, or made of equivalent materials.
2. Connectors must have a corrosion-resistant finish, and all surfaces and edges must be smooth to prevent damage to interfacing parts of the system.
3. Dee-rings and snaphooks shall have a minimum tensile strength of 5,000 pounds (22.2 kN).
4. Dee-rings and snaphooks must be proof-tested to a minimum tensile load of 3600 pounds (16kN) without cracking, breaking, or taking permanent deformation.
5. Snaphooks must be the locking type and must be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member.

6. Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged (the use of non-locking snaphooks is prohibited):
 - i. directly to webbing, rope or wire rope;
 - ii. to each other;
 - iii. to a dee-ring to which another snaphook or other connector is attached;
 - iv. to a horizontal lifeline; or
 - v. to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.
7. On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.
8. Horizontal lifelines must be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.
9. Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).
10.
 - i. Except as provided in paragraph ii. of this section, when vertical lifelines are used, each employee shall be attached to a separate lifeline.
 - ii. During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoistway, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 10,000 pounds [5,000 pounds per employee attached] (44.4 kN); and all other criteria specified in this paragraph for lifelines have been met.
11. Lifelines must be protected against being cut or abraded.
12. Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.
14. Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards, and tearing and deforming lanyards shall be

capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN) applied to the device with the lifeline or lanyard in the fully extended position.

15. Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.
16. Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:
 - i. as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
 - ii. under the supervision of a qualified person.
16. Personal fall arrest systems, when stopping a fall, shall:
 - i. limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;
 - ii. limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;
 - iii. be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;
 - iv. bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and,
 - v. have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

Note: If the personal fall arrest system meets the criteria and protocols contained in Appendix C to subpart M, and if the system is being used by an employee having a combined person and tool weight of less than 310 pounds (140 kg), the system will be considered to be in compliance with the provisions of paragraph (d)(16) of this section. If the system is used by an employee having a combined tool and body weight of 310 pounds (140 kg) or more, then the employer must appropriately modify the criteria and protocols of the Appendix to provide proper protection for such heavier weights, or the system will not be deemed to be in compliance with the requirements of paragraph (d)(16) of this section.

17. The attachment point of the body belt shall be located in the center of the wearer's back. The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.
18. Body belts, harnesses, and components must be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.
19. Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and can not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.
20. The employer shall provide for prompt rescue of employees in the event of a fall or must assure that employees are able to rescue themselves.
21. Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.
22. Body belts shall be at least one and five-eighths (1 5/8) inches (4.1 cm) wide.
23. Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part.
24. When a personal fall arrest system is used at hoist areas, it must be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

E. Positioning Device Systems –1926.502(e)

Positioning device systems and their use shall conform to the following provisions:

1. Positioning devices must be rigged so that an employee cannot free fall more than 2 feet (.9 m).
2. Positioning devices must be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.
3. Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.
4. Connectors must have a corrosion-resistant finish and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.
5. Connecting assemblies must have a minimum tensile strength of 5,000 pounds (22.2 kN)

6. Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.
7. Snaphooks must be locking types and shall be sized to be compatible with the member to which they are connected
8. Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:
 - i. directly to webbing, rope or wire rope;
 - ii. to each other;
 - iii. to a dee-ring to which another snaphook or other connector is attached;
 - iv. to a horizontal lifeline; or
 - v. to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.
9. Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.
10. Harnesses and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

F. Warning Line Systems –1926.502(f)

The warning line shall be erected around all sides of the roof work area. Warning line systems consist of ropes, wires, or chains, and supporting stanchions and are set up as follows:

- Flagged at not more than 6-foot intervals with high-visibility material.
- Rigged and supported so that the lowest point including sag is no less than 34 inches from the walking/working surface and its highest point no more than 39 inches from the walking/working surface.
- Stanchions, after being rigged with warning lines, must be capable of resisting, without tipping over, a force of at least 16 pounds (71 Newtons) applied horizontally against the stanchion, 30 inches above the walking/working surface, perpendicular to the warning line and in the direction of the floor, roof, or platform edge.

- The rope, wire, or chain must have a minimum tensile strength of 500 pounds (2.22 kilonewtons), and after being attached to the stanchions, must support without breaking the load applied to the stanchions as prescribed above.
- Shall be attached to each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in the adjacent section before the stanchion tips over.

When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge parallel to the direction of the mechanical equipment operation, and not less than 10 feet from the roof edge perpendicular to the direction of mechanical equipment operation.

When mechanical equipment is not being used, the warning line must be erected not less than 6 feet from the roof edge.

G. Controlled Access Zones –1926.502(g)

A controlled access zone (CAZ) is a work area designated and clearly marked in which certain types of work (such as overhand bricklaying) may take place without the use of conventional fall protection systems –guardrail, personal arrest or safety net –to protect the employees working in the zone.

Controlled access zones are used to keep out workers other than those authorized to enter work areas from which guardrails have been removed. Where there are no guardrails, masons are the only workers allowed in controlled access zones.

CAZs, when created to limit entrance to areas where leading edge work and other operations are taking place, must be defined by a control line or by any other means that restrict access. Control lines shall consist of ropes, wires, tapes or equivalent materials, and supporting stanchions, and must be:

- Flagged or otherwise clearly marked at not more than 6-foot intervals with high-visibility material.
- Rigged and supported in such a way that the lowest point is not less than 39 inches from the walking/working surface and the highest point is not more than 45 inches, nor more than 50 inches when overhand bricklaying operations are being performed from the walking/working surface.
- Strong enough to sustain stress of not less than 200 pounds (0.88 kilonewtons). Control lines shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.
- Control lines also must be connected on each side to a guardrail system or wall.

When control lines are used, they must be erected not less than 6 feet and not more than 25 feet from the unprotected or leading edge, except when precast concrete members are being erected. For precast concrete members, the control lines are to be erected not less than 6 feet and not more than 60 feet or half the length of the member being erected, whichever is less, from the leading edge.

For controlled access zones that are used to determine access to areas where overhand bricklaying and related work are taking place are to be defined by a control line erected not less than 10 feet and not more than 15 feet from the working edge. Additional control lines must be erected at each end to enclose the CAZ. Only employees working on overhand bricklaying or related work are to be allowed in the CAZ.

On floors and roofs where guardrails systems are not in place prior to the beginning of overhand bricklaying operations, CAZs must be enlarged as necessary to enclose are points of access, material handling areas, and storage areas.

On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

H. Safety Monitoring Systems –1926.502(h)

When no other alternative fall protection has been implemented, the employer shall implement a safety monitoring system. Employers must appoint a competent person to monitor the safety of workers and the employer must ensure that the safety monitor:

- Is competent in the recognition of fall hazards,
- Is capable of warning workers of fall hazard dangers and in detecting unsafe work practices,
- Is operating on the same walking/working surfaces of the workers and can see them, and
- Is close enough to work operations to communicate orally with workers and has no other duties to distract from the monitoring function.

Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-sloped roofs.

No worker, other than one engaged in roofing work (on low-sloped roofs) or one covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

All workers in a controlled access zone shall be instructed to promptly comply with fall hazard warnings issued by safety monitors.

I. Covers –1926.502(i)

Covers for holes in floors, roofs, and other walking/working surfaces shall meet the following requirements:

1. Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
2. All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
3. All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.
4. All covers shall be color-coded or they shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

Note: This provision does not apply to cast iron manhole covers or steel grates used on streets or roadways.

J. Protection From Falling Objects –1926.502 (j)

When guardrail systems are used to prevent materials from falling from one level to another, any openings must be small enough to prevent passage of potential falling objects. No material or equipment except masonry and mortar shall be stored within 4 feet of the working edges. Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear of the working area by removal at regular intervals.

During roofing work, materials and equipment shall not be stored within 6 feet of a roof edge unless guardrails are erected at the edge, and materials piled, grouped, or stacked near a roof edge must be stable and self-supporting.

Canopies –1926.502 (j)(8)

When used as protection from falling objects, canopies must be strong enough to prevent collapse and to prevent penetration by any objects that may fall onto them.

Toeboards –1926.502 (j)(2),(3), and (4)

The use of toeboards for falling object protection must comply with the following requirements:

1. Toeboards, when used as falling object protection, must be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below.
2. Toeboards shall be capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.
3. Toeboards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greatest dimension.
4. Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening shall be erected from the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

K. Excavations –1926.50 (b)(7)

Each employee at the edge of an excavation 6 feet or more deep must be protected from falling by guardrail system, fences, barricades, or covers. Where walkways are provided to permit employees to cross over excavations, guardrails are required on the walkway if the fall would be 6 feet or more to the lower level.

L. Formwork and Reinforced Steel –1926.501 (b)(5)

For employees, while moving vertically and/or horizontally on the vertical face of rebar assemblies built in place, fall protection is not required when employees are moving. OSHA considers the multiple hand holds and foot holds on rebar assemblies as providing similar protection as that provided by a fixed ladder. Consequently, no fall protection is necessary while moving point to point for heights below 24 feet. An employee must be provided with fall protection when climbing or otherwise moving at a height more than 24 feet, the same as for fixed ladders.

M. Hoist Areas –1926.501 (b)(3)

Each employee in a hoist area must be protected from falling 6 feet or more by guardrail systems or personal fall arrest systems. If guardrail systems or portions must be removed to facilitate hoisting operations, as during the landing of materials, and a worker must

lean through the access opening to receive or guide equipment and materials, that employee must be protected by a personal fall arrest system.

N. Holes –1926.501 (b)(4)

Personal fall arrest systems, covers, or guardrail systems must be erected around holes (including skylights) that are more than 6 feet above lower levels.

O. Leading Edges –1926.501 (b)(2)

Each employee who is constructing a leading edge 6 feet or more above lower levels must be protected by guardrail systems, safety net systems, or personal fall arrest systems. If the employer can demonstrate that it is infeasible or creates a greater hazard to implement these systems, he or she must develop and implement a fall protection plan that meets the requirements of 29 CFR 1926.502 (k).

P. Overhand Bricklaying and Related Work –1926.501 (b)(9)

Each employee performing overhand bricklaying and related work 6 feet or more above lower levels must be protected by guardrail systems, safety net systems, or personal fall arrest systems, or shall work in a controlled access zone. All employees reaching more than 10 inches below the level of a walking/working surface on which they are working shall be protected by a guardrail system, safety net system, or personal fall arrest system.

Q. Precast Concrete Erection –1926.501 (b)(12)

Each employee who is 6 feet or more above lower levels while erecting precast concrete members and related operations such as grouting of precast members shall be protected by guardrail systems, safety net systems, or personal fall arrest systems. However, where the employer can demonstrate that it is infeasible or creates a greater hazard to use those systems, the employer must develop and implement a fall protection plan that meets the requirements of 29 CFR 1926.502 (k).

R. Ramps, Runways, and Other Walkways – 1926.501 (b)(6)

Each employee using ramps, runways, and other walkways must be protected by guardrail systems against falling 6 feet or more.

S. Roofing

Low-Slope Roofs –1926.501 (b)(10)

Each employee engaged in roofing activities on low-slop roofs with unprotected sides and edges 6 feet or more above lower levels must be protected from falling by guardrail systems, safety net systems, personal fall arrest systems or a combination of a warning

line system and a safety monitoring system. On roofs 50 feet or less in width, the use of a safety monitoring system without a warning line system is permitted.

Steep-Slope Roofs –1926.501 (b)(11)

Each employee on a step roof with unprotected sides and edges 6 feet or more above lower levels shall be protected by either guardrail systems with toeboards, a safety net system, or a personal fall arrest system.

T. Wall Openings –1926.501 (b)(14)

Each employee working on, at, above, or near wall openings, including skylights, where the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface must be protected from falling by the use of either a guardrail system, a safety net system, or a personal fall arrest system.

When the bottom of a wall opening is less than 4 inches above the working surface, regardless of width, a standard toeboard or an enclosing screen shall protect it.

U. Training –1926.503

Employers must provide a training program that teaches employees that might be exposed to fall hazards how to recognize such hazards and how to prevent them. Training topics must consist of:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting fall protection systems;
- The use and operation of controlled access zones and guardrail, safety net, personal fall arrest, warning line, and safety monitoring systems;
- The role of each employee in the safety monitoring system;
- The limitations on the use of mechanical equipment during the performance of roofing work on low-slope roofs;
- The correct procedures for equipment and materials handling and storage and the erection of overhead protection;
- The employees' role in fall protection plans; and
- The standard in this Subpart.

Employers must develop a written certification that identifies the employee trained and the date of training. The employer or trainer must sign the certification when training is completed. Retraining should be provided when needed.

V. Fall Protection Plan –1926.502 (k)

This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work (See 1926.501(b)(2), (b)(12), and (b)(13)) who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

1. The fall protection plan must be prepared by a qualified person and developed specifically for the site where the leading edge work, precast concrete work, or residential construction work is being performed and the plan must be maintained up to date.
2. A qualified person must approve any changes to the fall protection plan.
3. A copy of the fall protection plan with all approved changes shall be maintained at the job site.
4. The implementation of the fall protection plan shall be under the supervision of a competent person.
5. The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible or why their use would create a greater hazard.
6. The fall protection plan must include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems. For example, the employer shall discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.
7. The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones and the employer must comply with the criteria in paragraph (g) of this section.
8. Where no other alternative measure has been implemented, the employer shall implement a safety monitoring system in conformance with 1926.502(h).

9. The fall protection plan must include a statement that provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.
10. In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) the employer shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

IV. Definitions

Anchorage –A secure point of attachment for lifelines, lanyards or deceleration devices.

Body belt –A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

Body harness –Straps that may be secured about the person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

Connector –A device that is used to couple (connect) parts of a personal fall arrest system or positioning device system together.

Controlled access zone –A work area designated and clearly marked in which certain types of work may take place without the use of conventional fall protection systems to protect the employees working in the zone.

Deceleration device –Any mechanism such as rope, grab, ripstitch lanyard, specially woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

Deceleration distance –The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

Guardrail system –A barrier erected to prevent employees from falling to lower levels.

Hole –A void or gap 2 inches or more in the least dimension in a floor, roof, or other walking/working surface.

Lanyard –A flexible line of rope, wire, or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

Leading edge –The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed or constructed.

Lifeline –A compact consisting of a flexible line for connection to an anchorage at one end to hang vertically, or for connection to anchorages at both ends to stretch horizontally, and that serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Low-slope roof –A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Opening –A gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition, through which employees can fall to a lower level.

Personal fall arrest system –A system including but not limited to an anchorage, connectors, and a body harness used to arrest an employee in a fall from a working level. Note: As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

Positioning device system –A body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning backwards.

Rope grab –A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

Safety-monitoring system –A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Self-retracting lifeline/lanyard –A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal employee movement and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snaphook –A connector consisting of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and when released automatically closes to retain the object.

Steep roof –A roof having a slope greater than 4 in 12 (vertical to horizontal).

Toeboard –A low protective barrier that prevents materials and equipment from falling to lower levels and which protects personnel from falling.

Unprotected sides and edges –Any side or edge (except at entrances to points of access) of a walking/working surface (e.g., floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches high.

Walking/working surface –Any surface, whether horizontal or vertical, on which an employee walks or works, including but not limited to floors, roofs, ramps, bridges, runways, formwork, and concrete reinforced steel. Does not include ladders, vehicles, or trailers on which employees must be located to perform their work duties.

Warning line systems –A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge and which designates an area in which roofing work may take place without the use of guardrail or safety net systems to protect employees in the area.